

PATENT ABSTRACTS OF JAPAN

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(54) SEALED BATTERY

(57)Abstract:

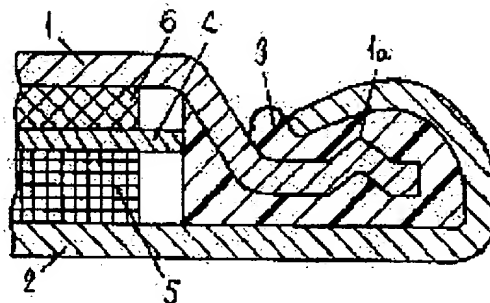
PURPOSE: To improve fluid leakage resistance of a sealed battery b providing a protrusion of concentric circumference in a flange part of a hat-shaped seal port plate, and compressing a gasket in a part corresponding to the protrusion by a prescribed compressing rate.

CONSTITUTION: In the case of performing a seal in assembling a battery, a concentric circular protrusion 1a is provided in a flange part of a seal port plate 1, to seal by calking a gasket interposed between the protrusion 1a and a positive electrode case 2. Here a

compressing rate, when it is less than 25%, is insufficient to lack fluid leakage resistance. When the compressing rate exceeds 75%, the gasket 3 is broken in the protrusion part 1a, to sometimes causes remarkably

decreasing the fluid leakage resistance. Accordingly, by setting the compressing rate of the

gasket to 25 to 75%, a packing effect of the gasket by a calking seal can be maintained for a long time, so as to enable the fluid leakage resistance to improve.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a cell case, an obturation plate and the sealing cell that comes to seal a generation-of-electrical-energy element with a gasket fluid-tight, especially the sealing cell which has improved liquid spill-proof nature.

[0002]

[Description of the Prior Art] In recent years, as for the coin form lithium cell of an organic electrolytic-solution system, and a carbon button form alkaline cell, small thin shape-ization has been demanded with the miniaturization of a use device. The obturation plate with which the conventional cell stands in a row in the shape of U character in a periphery and which had the section by return, or the hat-like obturation plate has been adopted. A coin form diacid-ized manganese lithium cell is shown in an example, and the structure of the conventional cell is shown in drawing 2 R> 2 and drawing 3.

[0003] It is the obturation plate which stands in a row in the shape of [to which 1 serves as a negative-electrode terminal in drawing 2] U character and which had the section by return. After the positive-electrode case where 2 serves as a positive-electrode terminal, the gasket, with which 3 consists of polyolefine system synthetic resin, such as polyethylene and polypropylene, the separator with which 4 consists of a polypropylene nonwoven fabric, and 5 mix an electric conduction agent and binders, such as a graphite, to a manganese dioxide, the positive electrode by which pressurization molding was carried out, and 6 are negative electrodes which use a lithium metal as an active material.

[0004] The assembly of a cell fills up the interior of a cell case with a negative electrode 6, a separator 4, a positive electrode 5, and nonaqueous electrolyte, and is performed by obturating in total inside through the gasket 3 which made opening of the positive-electrode case 2 intervene as an insulating material between both positive-electrode case 2 and obturation plate 1. Drawing 3 is the same as that of the structure of drawing 2 except having used the hat-like obturation plate.

[0005]

[Problem(s) to be Solved by the Invention] However, if the obturation plate which stands in a row in the shape of U character and which had the section by return is used for the periphery shown in drawing 2, when it is going to achieve thin shape-ization of a cell, since not only the thing which stand in a row in the shape of U character and which is done for press working of sheet metal of the section by return is difficult, but the process tolerance falls and there is no dimensional stability even if it processes it, liquid spill-proof nature falls.

[0006] When using a hat-like obturation plate, thin shape-ization of a cell can be performed easily. However, in case a positive-electrode case was bent and a gasket was compressed in the case of obturation, in order that a compression location might concentrate on positive-electrode case opening, liquid spill-proof nature was bad.

[0007]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, by this invention, the obturation plate which prepared the projection of a concentric circle periphery is used for

a flange by the shape of a hat.

[0008]

[Function] By using such an obturation plate, corresponding to two places, the projection part of the shape of a periphery of an obturation plate flange, and positive-electrode case opening, a part with high compressibility can be prepared in some gaskets at the time of caulking obturation, and the liquid spill-proof nature as a cell improves.

[0009]

[Example] The sealing form cell of the example of this invention is explained below, referring to drawing 1.

[0010] In drawing 1, 1 has the shape of a hat of this invention, and after the obturation plate which has projection 1a in concentric circular at the flange, the positive-electrode case where 2 serves as a positive-electrode terminal, the separator, with which a gasket and 4 consist of a polypropylene nonwoven fabric in 3, and 5 mix an electric conduction agent and binders, such as a graphite, to a manganese dioxide, the positive electrode by which pressurization molding was carried out, and 6 are negative electrodes which use a lithium metal as an active material. The assembly of a cell fills up the interior of a cell case with a negative electrode 6, a separator 4, a positive electrode 5, and nonaqueous electrolyte, and is performed by obturating opening of the positive-electrode case 2 in total inside through the gasket 3 made to intervene as an insulating material between both this case 2 and obturation plate 1.

[0011] The compressibility after caulking obturation (setting the thickness dimension before compression to 100) is suitable for 25% - 75% of the part of the gasket which intervenes between the heights and positive-electrode cases which were prepared in the obturation plate flange at this time. When the compressibility of a gasket is less than 25%, condensation is not enough and the liquid spill-proof nature as a cell falls. Moreover, when the compressibility after the caulking of a gasket exceeds 75%, the gasket compressed at the time of obturation may be turned off by the height prepared in the obturation plate flange, and causes a short circuit or the remarkable fall of liquid spill-proof nature. Therefore, 25 - 75% of the compressibility of the part corresponding to projection 1a of a gasket is desirable.

[0012] Next, as a concrete example of this invention, the gasket compressibility of an obturation plate height was changed by the cell of coin form diacid-ized manganese-lithium-cell CR2012 (the diameter of 20.0mm, thickness of 1.2mm, electric capacity 55mAh), and it considered as the cell of examples 1-5. Moreover, the cell constituted using the conventional obturation plate was made into the examples 1 and 2 of a comparison. The example 1 of a comparison constitutes a cell using the obturation plate which stands in a row in the shape of U character in a periphery and which had the section by return, and the example 2 of a comparison constitutes a cell using a hat-like obturation plate. Each 100 cells are constituted and the liquid spill incidence rate after carrying out 50 cycle operation of the liquid spill trial of the thermal shock cycle kept at 85 degrees C for 1 hour for 1 hour at -10 degrees C is shown in (Table 1).

[0013]

[Table 1]

封 口 板	封口板突起部分のガスケット圧縮率	漏液率
実施例 1	20%	5%
実施例 2	25%	0%
実施例 3	50%	0%
実施例 4	75%	0%
実施例 5	80%	5%
比較例 1	25%	40%
比較例 2	30%	25%

[0014] In addition, high density polypropylene was used for the material of a gasket. this (Table 1) -- from -- the outstanding effectiveness which prevents a liquid spill is acquired by making the compressibility after caulking obturation of the gasket which intervenes between the concentric circular projections and positive-electrode cases which used the obturation plate by this example, and were prepared in the obturation plate flange 25 - 75% so that clearly.

[0015] Moreover, this effectiveness is similarly acquired about the cell constituted using the object which used the obturation plate of this invention and really [direct] cast the gasket made from polymeric materials to the periphery of an obturation plate.

[0016]

[Effect of the Invention] According to the sealing cell which used the obturation plate of this invention, the compression condition that the packing effectiveness of the gasket by caulking obturation is maintainable over a long period of time can be realized, and the cell excellent in liquid spill-proof nature can be offered so that more clearly than explanation of the above example.

[0017] In addition, although the coin form diacid-ized manganese lithium cell explained in the above-mentioned example, it is applicable to other coin form lithium primary cells, a coin form lithium secondary battery, the alkali system primary cell of a carbon button form, an alkali system rechargeable battery, etc.

[Translation done.]